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ABSTRACT

Effective integration of technology as a learning/teaching tool requires present and future educators not only to be trained in computer use but also to have effective and practical models of computer integration. At Alverno College (Wisconsin) an introductory computer course was redesigned to emphasize technology as a teaching tool rather than remaining simply a course on computers. It included hands-on experiences; software evaluations; lesson planning; and incorporating computer use, educational methods, and research into educational computer topics. Rather than teaching students how to use computers effectively in their teaching, integration of computer use was incorporated into teaching, thus providing a model for students. Various workshops and training sessions to facilitate faculty growth were offered, resulting in an increase and expansion of computer use within the department. In the summer of 1991, the education department received a grant from the 3M Vision Initiative to improve the use of computers already available in elementary schools through a technology plan utilizing practical instruction for current classroom teachers and collaboration between Alverno faculty and education students. The grant plan had four phases: phase 1 dealt with awareness and information acquisition; phase 2 with getting the computer lab up and running; in phase 3 the plan would be implemented in the first target school; and phase 4 would consist of outreach and assessment. (LL)

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Building A Vision for Teacher Technology in Education

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> The computer is the most powerful new learning device since the invention of the printing press and the textbook. (Bork, 1984)

Over a decade has passed since the beginning of the computer "revolution" in education. Computers have neither sparked a broad revolution in teaching and learning, as some advocates predicted, nor quietly faded into disuse "(O'Neil, 1990). The revolution has dissolved into a computer proliferation. Student access to computers has definitely increased. More than two million computers dot the nation's classrooms. The ratio of students to computers has fallen from 125 students for each computer in 1983-84 to 22 students per computer in 1989 - 90 (O'Neil, 1990). The key word here is access. Although there are more computers available to students, their effective use as a teaching has been slow to change. The shift away from teaching about the computer to teaching with the computer has made some gains. The most significant change in this area is in the replacement of programming with word processing and keyboard skills. Application software has assumed a major role in this change. Word processors, spreadsheets, graphics generators, desktop publishing tools, sensors, and databases provide a creative base for effective computer integration.

Unfortunately the pattern of software use in most areas remains fairly traditional. Computer and software use remains focused on recall of facts and algorithms rather than providing a learning environment for higher level processing skills, problem solving and critical thinking. Most occasions in which students do use "tool- oriented" applications such as spreadsheets and database programs occur in connection with computer education classes, rather than integrated into subject areas. Computers in most subject-matter classes serve primarily as enrichment or individual remediation rather than as a major way that students learn to think and accomplish learning and understanding. (Becker, 1991)

Effective integration of technology as a learning/teaching tool requires present and future educators to be trained not only in computer use, but to have effective and practical models of computer integration. Teacher education faculty must assist in providing these models for integrating technology into the curriculum. In order to accomplish this goal, education faculty must be provided with the training and knowledge to research and develop these models. In addition , they must serve as models to education students by effectively integrating technology into their own classrooms.

The purpose of this paper is to describe the evolution of a plan to build a vision for teacher technology in education. What began as a discussion of the "computer literacy" needs of education students has evolved into a outreach program to improve computer use in schools. This program focuses on practical instruction for current classroom teachers and collaboration between teachers, Alverno faculty, and education students.

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Concerns and Questions

In the mid eighties Alverno's education faculty began questioning and expressing their concerns pertaining to the role of technology in education. Computers had arrived as an educational topic. They were present in field placement schools and in the college. The question, and the concern, of how to prepare education students to utilize this technology was voiced. What role would technology play in education? How could future (and present) teachers utilize technology to enhance education? How could we, as an education faculty, address these questions? An informal survey on the present use of technology in the education department was taken. The results of the survey added to the questions and the concerns. Education courses did not utilize technology as a tool for the students. At this time, the only education course dealing with technology in some aspects was an instructional media course. Education students were required to take an introduction to computers course, however the course content emphasized the computer itself and did not deal with incorporating the technology into teaching. The nation wide emphasis of the time was to familiarize educators with technology and hope they could then incorporate it somehow in their teaching.

Initially, these concerns were addressed by developing special sections of the introduction to computers course for education students. The emphasis for these sections was still the computer itself, programming being the dominate medium. With the advent of more educationally sound software and increasingly affordable hardware, shifts were made and new questions and concerns arose. Collaboration began between the education department and the computer studies department on designing a course that would more effectively address the needs of education students and technology in education as a whole.
Building on national research for technology in education, the course was redesign to emphasize technology as a teaching tool, rather than a course on computers.

Developing the Questions

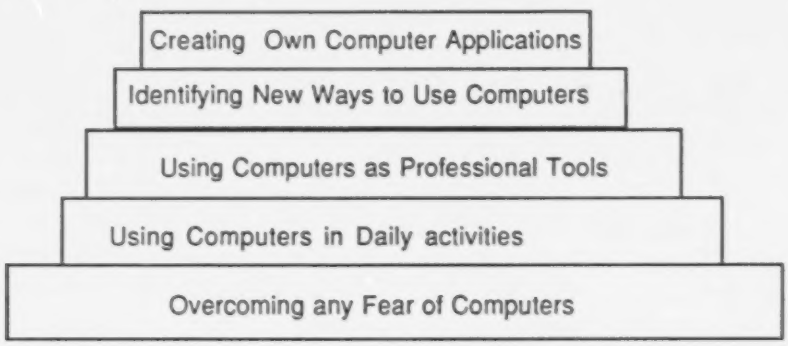
The new course on computers for educators was introduced, accentuating the computer as a teaching tool for use across the curriculum. Hands on experiences, software evaluations, lesson planning incorporating computer use, educational methods and research into educational computer topics comprised the major content of the course. Students learned about computer use by participating in activities that could be incorporated into their field placements. Instruction concerning the computer decreased; effective integration of computers as a learning and teaching tool increased. The initial feedback on the course was positive. Students began to incorporate the technique and ideas from the course into other education classes. With this positive feedback other questions began to surface. Most typical was the concern - could one course provide students sufficient background for effectively integrating computers into their teaching? How could the education department more effectively address the concern of effective utilization of technology?

During discussions on these questions certain issues surfaced. The paradigm began to shift from providing students with a background for computer use in schools, to developing a model by utilizing the technology across the curriculum in the education department. Rather than simply teaching students how to effectively use computers in their teaching, we began to move to integrating computer use within our own teaching, thus providing a model for our students. The impact of this shift was to develop a plan to integrate technology throughout the education

curriculum.

Formulation of a Technology Plan

Two faculty members were given release time to develop a technology plan for the education curriculum. The goal of the plan was to have all faculty/students integrate technology into their teaching/learning and classroom activities. To develop a plan to move toward this goal, current needs were assessed by means of discussions and survey. The results of these discussions and survey indicated the faculty had a wide diversity in computer use and background. The following model for computing literacy was adapted from Athey, Day and Zmud (1987) to address the concerns and diverse needs of the faculty.


Creating Own Computer Applications
Identifying New Ways to Use Computers
Using Computers as Professional Tools
Using Computers in Daily activities
Overcoming any Fear of Computers

With the goal and tentative model in place, a faculty needs assessment was undertaken. The feedback from this assessment included a variety of needs and ideas which were integrated to form a starting point. These included:

- workshops and training in a variety of levels to meet diverse backgrounds;
- instruction in utilities to enhance design of course materials,;
- collaboration with methods teachers on computer use in their courses;
- methods for utilizing computers in whole class instruction;
- methods for computer integration in Language Arts courses;
- cooperative work with other departments concerning technology use;
- development of grant proposals;
- creation of a Education Technology Resource Center.

During the year various workshops and training sessions to facilitate faculty growth were offered. These workshops addressed a range of topics and background levels, including course materials preparation, classroom presentation, software demonstrations and evaluations. Faculty were encouraged to assess their individual starting point on the model and move toward a higher level. Plans for a Technology Resource Center, to provide hands on work for the faculty, were finalized. This Center would include resource materials, software and several computer systems to provide the faculty with "easy access" to technology. Grant proposals were written to obtain funding to enhance the department and college computer facilities .

3M Vision Initiative Grant

In the summer of 1991, the Education Department of Alverno College received a grant from the 3M Vision Initiative . The purpose of the grant is to improve the use of computers already available in elementary schools with high minority populations through practical instruction for current classroom teachers and collaboration between teachers and Alverno education students. The integration of appropriate software with on-site technology and lesson planning will lead to more productive instruction approach guided by careful assessment of student learning outcomes.

The grant is designed to meet the needs of teachers who currently have computers available to them, but are unsure of how to use these resources effectively. Their concerns include how to choose appropriate software, how to use this software, and how to make software work with what they already know how to do. Currently, teachers use the computer mainly for drill and practice exercises or for games that are a reward for doing other work. Too often, the use of the computer has little to do with the goal of effective learning. To improve instruction and student outcomes, the needs of both the current teacher population and the teacher education students preparing to enter classrooms must be addressed.

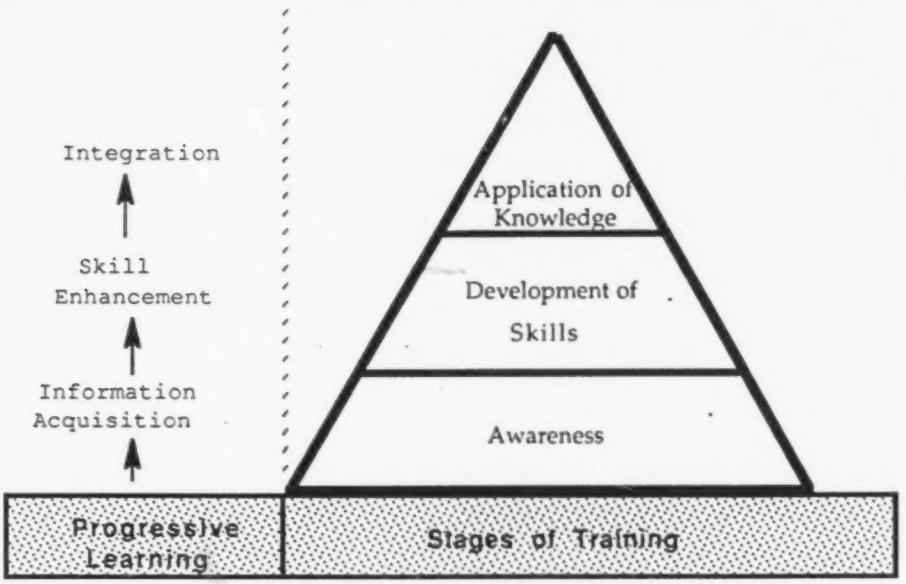
A key component of the grant is to develop a series of workshops for teacher in-service at a target school, giving the teachers background as well as hands on experience. Since it is difficult to integrate computer technology, junior-level students will be assigned to field work placements at the target schools. These students have completed the introductory computer application course in language arts, and will be paired with a teacher with whom they would work to design lessons that use the computer in large and small group settings.

The arrangement would benefit each aspect of the instructional matrix. The Alverno field student would have the benefit of the teacher's experience in lesson design and the student advantage of computer experience time to locate or develop materials for use in the classroom. The most significant impact would be with the elementary school students whose learning outcomes would be improved by the adept use of technology to deal with varied learning styles.

An important part of the design of this project is a model dedicated computer lab to which students have access at the college. In the specially-equipped space they work with their content area methods teachers and experiment with materials prepared in collaboration with their practitioner partner. Methods courses have been redesigned to incorporate computer applications for whole class and small group instruction; the use of the new lab provides time for intensive, creative development of classroom materials.

Reconceotualizing the Technology Plan

The awarding of the 3M grant afforded a unique opportunity to reconceptualize the technology plan to provide collaboration between Alverno faculty , teachers and education students. The following model from Sunil Hazari (1991 p. 49) higher education training was integrated with the 3M Vision Grant to form this reconceptualization.



Hazari's progressive learning and stages of training formed the foundation for the 3M grant plan as well as the continuing development of integrating faculty/student technology use into teaching/learning classroom activities.

The 3M Grant plan evolved into four phases. The first two phases were the focus of the past year. Phase one dealt with awareness and information acquisition. In the fall of 1991 this plan was formulated and research began into equipment selection for the model dedicated computer lab. To provide Alverno students with new technology , meet the needs of the target school and provide for growth and outreach to additional sites, the Macintosh LC was selected. This multi -platform-platform machine enables the user to take full advantage of the Macintosh platform, as well as serving as an Apple IIe. This would enable both Alverno students and target school teachers to make full use of the dedicated lab. This lab was designed to serve as both a classroom and a computer center providing projection capabilities for demonstrations and individual or group work.

Phase two involved getting the lab up and running along with providing training and inservice for education faculty. Language arts methods instructors worked collaboratively with the project coordinators to plan workshops for both education faculty and target school teachers. The focus of these workshops was to provide creative communication through Language Arts using technology. Writing as a social activity became the major emphasis. Concentrating on the social-interaction aspect of writing, model activities were designed which involved the student/teacher in reading, writing, speaking and listening skills. Various word processing packages were used to provide added experiences. Using word processors in Language Arts provides the additional benefits of social-interaction, creativity and individuality in teacher activity design, low expense (a variety of activities can be done with one software package), and the students learn a word processor as they work on language arts activities.

The third phase of the project will be the implementation of the plan within the first target school. This will be a year long endeavor involving additional workshops for both Alverno and the target school faculty. Language arts method courses and field classes have been redesigned to incorporate computer technology and training for Alverno students. Besides working directly with the target school, field students will work informally with additional selected sites. During the year field students will also work with the project coordinators to gather information for assessment of the project.

The final phase involves both outreach and assessment of the project. Assessment tools will be used at the target school to form a basis for evaluating the pilot project. Outreach programs, connected to Language Arts method courses and field seminars will begin at additional schools.

Conclusion

Throughout the evolution of this technology plan, computer use within the department has continued to grow and expand. Professional use of computers among education faculty has increased and computer anxiety has decreased. Technology use within education courses has also increased. Students regularly utilize computers in social studies, science, and mathematics method courses. Not only do students explore models of computer integration within these subject areas, technology has become a tool used in their own instruction. Foreign language and bilingual education faculty are currently exploring methods to integrate technology to enhance instruction within their courses.

As Alverno's Education Department moves into the implementation phase of the 3M Grant, building a vision for teacher technology in education continues to grow and evolve. The following thought, from early computer days, summarizes the spirit of Alverno's technological vision:

> The most critical element in establishing a computer plan in a school is not the hardware or software, but the HEADWARE. The headware, or positive mind set, can be achieved only when people find the microcomputer familiar and comfortable to work with, when exposure to computers is face-to-face, non-threatening, functional, and ongoing. (Lombardi, 1983)

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